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RELIABILITY OF THE TUBERCULIN TEST

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Various kinds of tests have done much to facilitate the progress of mankind. Some are of simple mechanical nature; others relate to highly specialized sciences. Within the memory of the present generation many technical tests have been developed with resulting benefit to agriculture. The chemical test for determining butterfat in milk is a familiar example. Others have to do with the fertility of the soil and the nutritive properties and purity of foods.

In human and veterinary medicine there are likewise many tests to determine the presence of certain diseases and the freedom of the body from various disorders. Among such tests is the use of tuberculin for determining the presence of tuberculosis, sometimes called the "captain of the men of death." The test is based on well-established scientific principles evolved by more than 25 years of experimental work prior to 1917, when the cooperative work of tuberculosis eradication began. It is among the most dependable tests for disease. Yet, because this test is widely used as a basis for detecting and condemning tuberculous livestock, its dependability is sometimes questioned, and uninformed critics have publicly made many unfounded statements concerning its use. The following well-established facts are, therefore, presented for the public's information.

TUBERCULIN IS HARMLESS

Tuberculin is a product prepared by sterilizing, filtering, and concentrating the liquid upon which tubercle bacilli have been allowed to grow. It was first made by the great scientist, Robert Koch, who found, in 1890, that it caused a rise in temperature when injected into the tissues of a tuberculous animal, but that it had no effect upon animals free from tuberculosis. Tuberculin contains the sterile product of the growth of the germs, but not the germs themselves, and when properly used it can have no possible injurious effect on healthy cattle. Furthermore, the tuberculin that is commonly used in testing livestock in the United States is made under Government supervision, which assures its purity and potency. (Fig. 1.)

Although tuberculin is the means by which tuberculous infection may be detected in animals, an accurate diagnosis depends likewise upon ability to observe and interpret the results of the test. The

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Department of Agriculture requires that the official testing of livestock for tuberculosis be performed by trained veterinarians who have demonstrated their ability to make the test properly. Of the three official methods of tuberculin testing—the subcutaneous, intradermic, and ophthalmic (fig. 2)—the one most commonly used is the intradermic by reason of its greater suitability for testing under farm and ranch conditions. In the intradermic test, the tuberculin is injected into the skin and the reaction, in the case of a diseased animal, consists of a swelling at the point of injection.

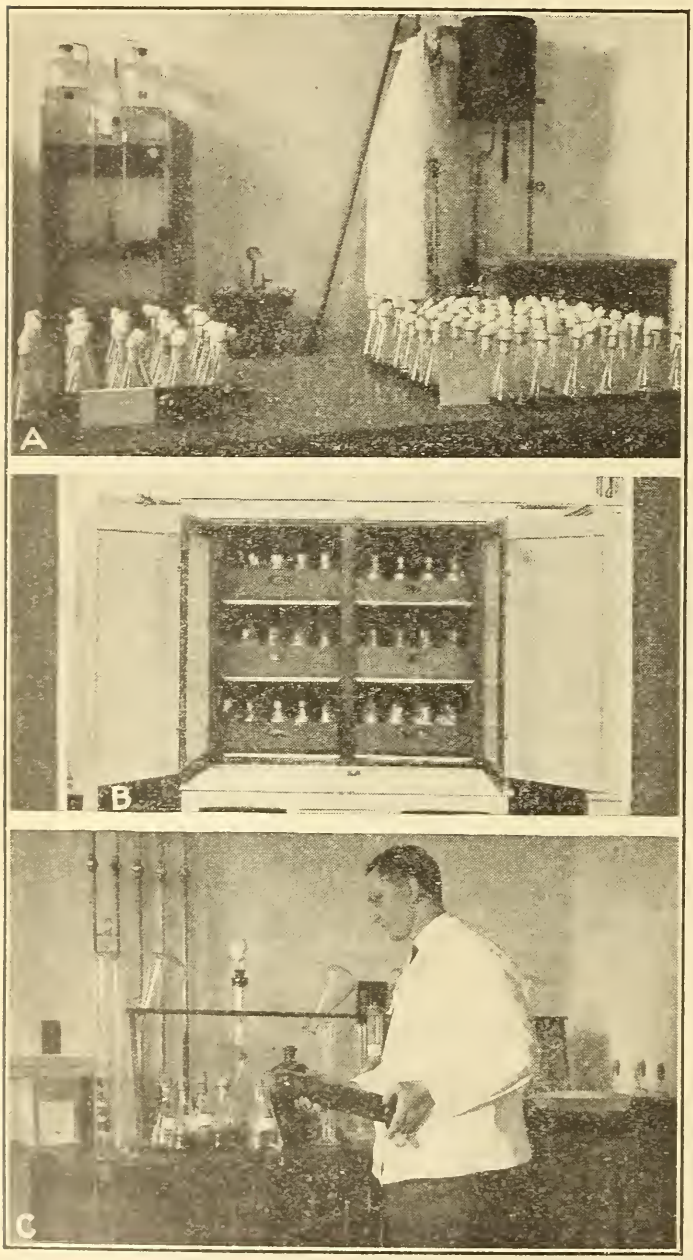

FIGURE 1.—Steps in the making of tuberculin: A, Culture media ready for use; B, pure cultures in an incubating unit; C, preparing tuberculin from sterilized cultures after filtration

RETESTING SHOWS EFFICIENCY OF METHOD

The results obtained thus far in systematic tuberculin testing show the effectiveness of this valuable means for detecting tuberculous animals. During the last 12 years, more than 1,500,000 tuberculous cattle have been removed from herds in the United States. As a result of this work, more than 168,000 herds are now established as fully accredited, and more than 2,000,000 additional herds, including those tested in area work, have been freed of tuberculosis. Even badly infected herds have been freed of the disease in a few years, by continued testing. A survey covering 24,550 herds, containing 571,000 cattle, shows that the first two tests remove most of the tuberculous animals. Although four tests cleaned up more than 97 per cent of the herds, continued testing is advised as a precautionary measure. These tests are usually applied at intervals of from three to six months.

Systematic testing has also eradicated bovine tuberculosis from large areas, resulting in the establishment of more than 700 counties, including two entire States—North Carolina and Maine—as modified accredited areas. Results of retesting in over 160 such areas indicate a high degree of testing efficiency.

MEAT-INSPECTION RECORDS REVEAL LESS TUBERCULOSIS

The records of the Federal meat-inspection service give evidence of the most conclusive kind that, since systematic tuberculosis eradication was begun, in 1917, there has been a marked decline in tuberculous infection among cattle. This service involves the veterinary examination of approximately 10,000,000 cattle and upwards of 40,000,000 swine annually, in addition to other food animals which are not commonly infected with tuberculosis. The figures—excluding reactors detected by tuberculin testing—show that 2.1 per cent of the cattle slaughtered in 1917 were affected with tuberculosis, as compared with only 1 per cent in 1928.

More than 55,000,000 tests have been applied since 1917, from which it will be realized that full opportunity for knowledge and experience has been afforded. In not a single instance reported during the

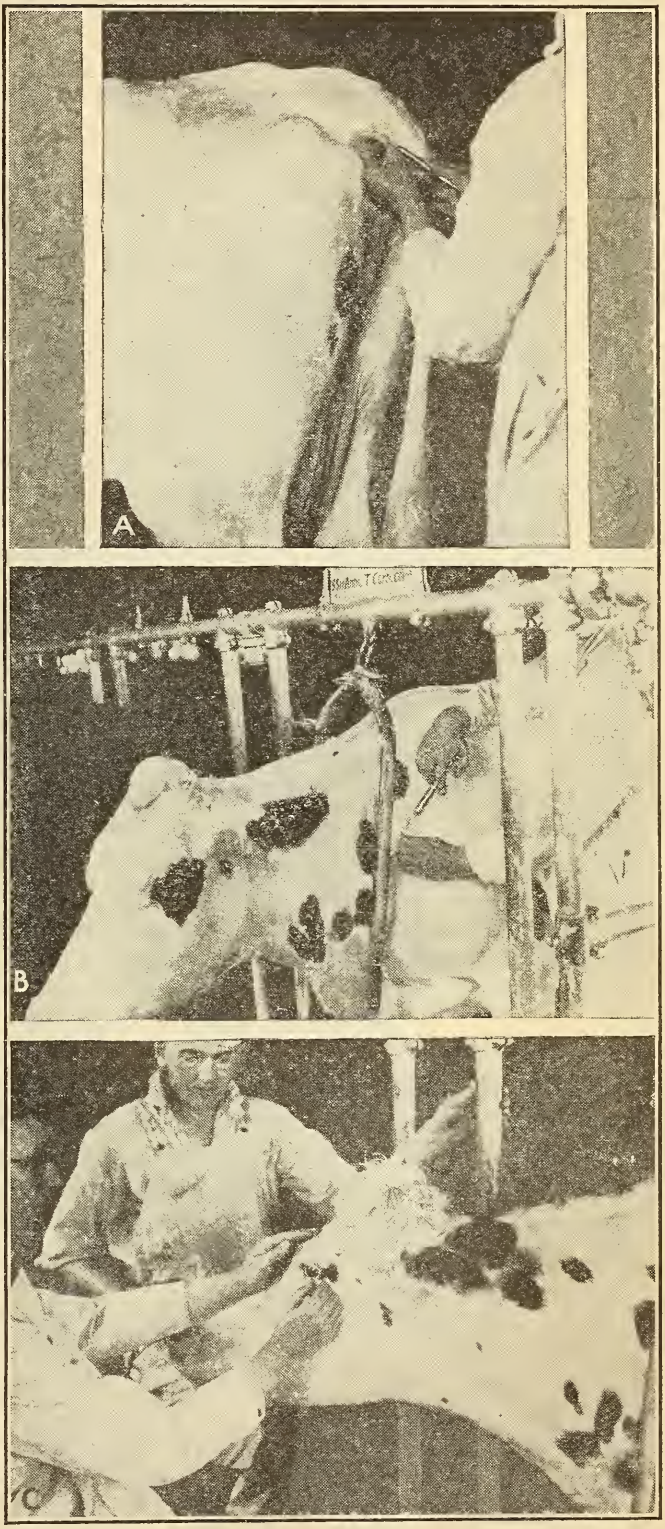

FIGURE 2.—Three methods of using tuberculin to detect tuberculosis in cattle: A, Intradermic; B, subcutaneous; C, ophthalmic. The intradermic method is the test principally used in cooperative tuberculosis-eradication work

application of this vast number of tests has it been shown that any animal was adversely affected by the injection of tuberculin. Hundreds of herds have been tested repeatedly for from 10 to 20 years without any adverse effects, and in most instances these herds are outstanding ones in their communities.

CONCERNING "NO-VISIBLE-LESION" REACTORS

At times the animals which react to the tuberculin test do not show visible signs of the disease when slaughtered. Though such cases are a small proportion of the total, yet they may cause doubt and misgivings among cattle owners. It is natural for the owner of a reactor, which shows no visible lesions when slaughtered, to think that the test was in error.

Usually the disease affects only a small number of organs which are always examined by inspectors. But it has been found also, through more searching examinations, in 57 different locations in bovine carcasses, including remote places not commonly observed in routine post-mortem examination. The actual incidence of so-called no-visible-lesion cases, based upon the cattle tested, is only 0.3 per cent, or 3 animals out of every 1,000 tested. However, microscopic examinations of numerous specimens, from cases apparently having no lesions, have shown a large number of infected tissues. Thus the low percentage of cases in which lesions were not observed is reduced still further by positive laboratory findings.

The tuberculin test indicates the presence of the disease but does not show the progress which the infection has made within the body. Hence, in the early stages of the disease, it is entirely possible for an animal which is actually infected with tuberculosis to show no visible signs on either ante-mortem or post-mortem examination. The best scientific evidence and observations of millions of carcasses indicate that the tuberculin test is more reliable than the customary post-mortem examination as a means of detecting tuberculosis.

RESULTS SHOW DEPENDABILITY

Briefly, the tuberculin test has been known and used for fully a third of a century; it is our most dependable means of detecting tuberculosis; and millions of post-mortem examinations by trained Federal inspectors show that systematic tuberculin testing is rapidly reducing tuberculosis among livestock in the United States.

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